REMARKS

Applicant appreciates the time taken by the Examiner to review Applicant's present application. This application has been carefully reviewed in light of the Office Action dated March 8, 2007. This Reply encompasses a bona fide attempt to overcome the rejections raised by the Examiner and presents amendments as well as reasons why Applicant believes that the claimed invention, as amended, is novel and unobvious over the applied prior art. Accordingly, Applicant respectfully requests reconsideration and favorable action in this case.

Rejections under 35 U.S.C. § 112

Claims 24, 36, and 52 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Examiner alleged that claims 24, 36, and 52 contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant respectfully disagrees. The rejection is traversed for the following reasons.

There is a strong presumption that an adequate written description of the claimed invention is present when the application is filed. *In re Wertheim*, 541 F.2d 257, 263, 191 USPQ 90, 97 (CCPA 1976) ("we are of the opinion that the PTO has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims"). Applicant respectfully submits that the Examiner has not met this initial burden.

Claim 24 recites, among others, "each of the N to 1 switching elements comprises an N to 1 semiconductor optical amplifier."

Claim 36 recites, among others, "each switching element is a semiconductor optical amplifier."

Claim 52 recites, among others, "each of the N to 1 the switching elements comprises an N to 1 semiconductor optical amplifier."

The Examiner rejected claims 24, 36, and 52 for reciting "a NX1 semiconductor optical amplifier." The Examiner appeared to be unclear what a Nx1 semiconductor optical amplifier is: "It is unclear what this is. There is no SOA shown. Are there numerous SOA elements in this

device or just one? Is the SOA providing the switching? If it is how is it providing switching?" *See,* Office Action, page 3, paragraph 3.

Various semiconductor optical amplifiers (SOAs) were known to those skilled in the art at the time the application was filed. Generally, there is an inverse correlation between the level of skill and knowledge in the art and the specificity of disclosure necessary to satisfy the written description requirement. Information which is well known in the art need not be described in detail in the specification. See, e.g., *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1379-80, 231 USPQ 81, 90 (Fed. Cir. 1986). What is conventional or well known to one of ordinary skill in the art need not be disclosed in detail. See *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d at 1384, 231 USPQ at 94. See also *Capon v. Eshhar*, 418 F.3d 1349, 1357, 76 USPQ2d 1078, 1085 (Fed. Cir. 2005)("The 'written description' requirement must be applied in the context of the particular invention and the state of the knowledge.... As each field evolves, the balance also evolves between what is known and what is added by each inventive contribution."). If a skilled artisan would have understood the inventor to be in possession of the claimed invention at the time of filing, even if every nuance of the claims is not explicitly described in the specification, then the adequate description requirement is met. See, e.g., *Vas-Cath*, 935 F.2d at 1563, 19 USPQ2d at 1116; *Martin v. Johnson*, 454 F.2d 746, 751, 172 USPQ 391, 395 (CCPA 1972) (stating "the description need not be in *ipsis verbis* [i.e., "in the same words"] to be sufficient").

Applicant respectfully submits that, at the time of the invention, one skilled in the relevant art would have had no problem in making and/or using the invention as claimed in claims 24, 36, and 52 upon reading and understanding Applicant's disclosure. As an example, the Examiner's attention is respectfully directed to pages 19-20 of the specification, particularly paragraph 49, which describes various embodiments of SOAs, and FIGURE 6, which shows SOAs 78. In the FIGURE 6 embodiment, the switching elements 78 are shown as sixteen input, one output SOAs (16X1 SOAs), each of which is capable of routing from any of its sixteen inputs to its single output. As specifically described in paragraph 49 of the specification, the switching elements 78 can be SOAs or any switching elements that are capable of transporting optical data through the optical cross-bar switch. With respect to claims 24 and 52, any multiple-input to a single output (i.e., N input to 1 output) SOA will do.

Accordingly, withdrawal of this rejection is respectfully requested. If the Examiner disagrees, Applicant respectfully requests that the Examiner provides evidence or reasons why

persons skilled in the art would not recognize in the disclosure a description of the invention defined by claims 24, 36, and 52.

Rejections under 35 U.S.C. § 103

Claims 1-5, 8-10, 19-28, 31-34, 45-48, 50-54, 57-62 and 68 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,721,315 ("Xiong") in view of U.S. Patent No. 6,501,869 ("Athale"). Applicant notes that dependent claims 19-21 were improperly rejected over Xiong and Athale as their independent claim 11 was not rejected over Xiong and Athale. Dependent claims 6-7 and 29-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Xiong in view of Athale and further in view of U.S. Publication No. 2002/0040866 ("Antoniades"). Traversal to the rejections is collectively discussed below with respect to independent claim 1, which was rejected over Xiong and Athale.

Claim 1 recites an optical switch fabric, comprising:

at least one optical switching matrix comprising

a plurality of input links;

a plurality of output links, wherein each of the plurality of input links intersects with each of the plurality of output links;

a plurality of path switches with one path switch located at each intersection of an input link and an output link, wherein each of the plurality of path switches is operable to communicate optical data from intersecting input link to an intersecting output link, wherein each of the plurality of path switches is configurable to close or open to create a plurality of unique paths in a given switching time interval for transporting the optical data through the optical switching matrix without contention or congestion.

The Examiner alleged that Xiong "teach a plurality of inputs (510), plural[*sic*] outputs (535) [of] an optical switching matrix, which provide *a* unique path between inputs and outputs in dependence of how the switch is configured." The Examiner did not cite any portion of Xiong to support this allegation. Applicant is unable to find anywhere in Xiong that explicitly describes "a plurality of path switches with one path switch located at each intersection of an input link and an output link, wherein each of the plurality of path switches is operable to communicate optical data from intersecting input link to an intersecting output link, wherein each of the plurality of path switches is configurable to close or open to create a plurality of unique paths in a given switching time interval for transporting the optical data through the optical switching matrix

without contention or congestion." If this rejection is to be maintained in the next Office Action, Applicant respectfully requests the Examiner to provide technical reasons as to why Xiong is applicable to claim 1 and cite specific columns and line numbers of Xiong in support of his technical reasons.

Applicant submits that Xiong is not applicable to claim 1 because Xiong does not teach specifics about the switching matrix. The lack of specific teachings by Xiong about the switching matrix is acknowledged by the Examiner on page 3 of the Office Action. The Examiner attempted to remedy Xiong's deficiencies by citing Athale as teaching that it [was] well known in prior art systems to use a switching matrix made up of an array of SOAs. One flaw in combining Xiong and Athale is that the combination fails to teach all the claim limitation as required to establish a *prima facie* case of obviousness. It has long been established in the U.S. Patent Law that, for a rejection under 35 U.S.C. § 103(a) to stand, the applied art much teach each and every element as recited in the claims. "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). To this extent, it appears that the Examiner has failed to consider all words in claim 1.

Moreover, as noted in a recent Supreme Court decision *KSR Int'l Co. v. Teleflex, Inc.*, No. 04-1350 (U.S. Apr. 30, 2007), it is important to identify an apparent reason that would have prompted a person of ordinary skill in the relevant field to combine the prior art elements in the manner claimed. The Court further noted that the analysis supporting a rejection under 35 U.S.C. § 103(a) should be made explicit. The Court specifically stated:

> Often, it will be necessary ... to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the market place; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit. KSR, slip op. at 14.

Applicant submits that no such explicit analysis is found in the Office Action. Applicant further submits that there was not apparent reason that would have promoted a person of ordinary skill in the relevant field at the time of the invention to combine Xiong and Athale and

thus replacing Xiong's optical switching matrix 515 with Athale's switching matrix which is made up of an array of SOAs. On the contrary, timing and not speed is what appears to be a concern of Xiong in building a burst-switched network. This is because burst payloads are optical analog signals. When a burst payload enters the optical switching matrix, if no path is set up the burst payload is lost. To address this problem, Xiong specifically teaches an input fiber delay line to introduce delay. *See* Xiong, col. 6, lines 33-45. Without specifics about the switching matrix, simply combining Xiong with faster switching SOAs would seem to cause more burst payloads to be dropped and/or more delays introduced. Thus, it would seem to be counter-intuitive, if not counter-productive, for a person having ordinary skill in the art to combine Xiong and Athale.

One advantage provided by embodiments of the invention as claimed in claim 1 is the ability to create a plurality of unique paths in a given switching time interval for transporting the optical data through the optical switching matrix without contention or congestion. This is achieved by arranging a plurality of path switches with one path switch located at each intersection of an input link and an output link, wherein each of the plurality of path switches is operable to communicate optical data from intersecting input link to an intersecting output link, wherein each of the plurality of path switches is configurable to close or open so that no two input links will communicate data to the same output link in the given switching time interview. *See* Specification, page 24, paragraph 57. The combination of Xiong and Athale cannot achieve this.

Throughout the Office Action, the Examiner alleged that "it is[*sic*] obvious that these means determine patters[*sic*] for delivery of the packets from ingress to egress and open and close the switches based on the determination, which provides for routing the packets on unique paths. " *See, e.g.,* Office Action, pages 4, 7, and 9. Contrary to the Examiner's allegation, at the time the invention was made, it would not have been obvious to one of ordinary skill in the art that a combination of ingress nodes, egress nodes, a switch control unit, and a routing processor as disclosed by Xiong would provide for routing the packets on unique paths or that controlling the switching elements as per Athale could create unique paths. As submitted above, Xiong and Athale, individually and in combination, do not teach or suggest creating a plurality of unique paths in a given switching time interval for transporting the optical data through the optical switching matrix *without contention or congestion.* Thus, it would seem that the rejections are based on facts within the personal knowledge of the examiner. Per MPEP 2144.03, Applicant respectfully requests an affidavit from the examiner stating such facts. In the alternative, Applicant respectfully requests the rejections be withdrawn.

In view of the foregoing, claim 1 is submitted to recite subject matter not reached by Xiong and Athale under 35 U.S.C. § 103(a) and therefore should be allowed. For similar reasons as submitted above, independent claims 22, 45, and 57 are submitted to be allowable over Xiong and Athale. Reliance is placed on *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) for the allowance of dependent claims 2-10, 23-34, 46-48, 50-54, 58-62 and 68, since they differ in scope from their independent claims 1, 22, 45, and 57.

Claims 11-12, 14-16, 19-21 and 45 were rejected under 35 U.S.C. §103(a) as being unpatentable over Xiong in view of U.S. Patent No. 5,757,526 ("Shiragaki"). Dependent claim 13 was rejected under 35 U.S.C. §103(a) as being unpatentable over Xiong in view of Shiragaki in view of Athale. Dependent claims 17-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Xiong in view of Shiragaki in view of Antoniades. Traversal to the rejections is collectively discussed below with respect to independent claim 11, which was rejected over Xiong and Shiragaki.

Claim 11 recites an optical switching core comprising:

a plurality of switching matrices, each switching matrix further comprising:

a plurality of inputs;

a plurality of outputs, wherein at least one input at a switching matrix intersects with at least one output at the switching matrix; and

a plurality of path switches, wherein a path switch is located at each intersection between an input and an output and wherein the path switch at each intersection is operable to communicate data from the intersecting input to the intersecting output, and

a plurality of cross links linking each of the plurality of switching matrices to at least one other switching matrix.

The combination of Xiong and Shiragaki fails to establish a *prima facie* case of obviousness against claim 11 for similar reasons as submitted above with respect to claim 1. In particular, Applicant respectfully submits that the combination of Xiong and Shiragaki fails to teach each and every element as recited in claim 11. The Examiner did not articulate how the combination of Xiong and Shiragaki applies to claim 11. If this rejection is to be maintained in the next Office Action, Applicant respectfully requests the Examiner to provide technical reasons as to why the combination of Xiong and Shiragaki applies to claim 11 and cite specific columns and line numbers of Xiong and Shiragaki in support of his technical reasons. In the alternative, Applicant respectfully requests the rejection be withdrawn.

Acknowledging that Xiong does not teach specifics about the switching matrix, the Examiner appeared to rely on Figure 10 of Shiragaki to fulfill the void of Xiong. Applicant respectfully submits that Shiragaki also does not teach the specifics about the switching matrix and that there was not apparent reason to combine Xiong and Shiragaki. The cited Figure 10 of Shiragaki is a figure for explaining an example light separating node. Specifically, the cited Figure 10 of Shiragaki exemplifies a problem similarly faced by conventional systems – since there is no detecting means for detecting breakage even when the optical transmission path is broken, a fault of the optical transmission path in a node cannot be recognized. *See* Shiragaki, col. 6, lines 3-7.

As one skilled in the art would have readily recognized, optical communication networks are known to have many complicated implementation requirements, including complex configuration and precise calibration. Thus, contrary to the Examiner's allegation on pages 5 and 6 of the Office Action, it would not have been obvious to one of ordinary skill in the art at the time of the invention to simply use an array of matrix as taught by Shiragaki as the matrix switch of Xiong, particularly in view of the fact that the array of matrix as taught by Shiragaki suffers a conventional problem and Xiong lacks specifics about the switching matrix.

In view of the foregoing, claim 11 is submitted to recite subject matter not reached by Xiong and Shiragaki under 35 U.S.C. § 103(a) and therefore should be allowed. For similar reasons as submitted above, independent claim 45 is submitted to be allowable over Xiong and Shiragaki. Reliance is placed on *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) for the allowance of dependent claims 12-21, since they differ in scope from their independent claim 11.

Claims 35-36 and 39-40 were rejected under 35 U.S.C. §103(a) as being unpatentable over Athale. Dependent claims 41-42 were rejected under 35 U.S.C. §103(a) as being unpatentable over Athale and further in view of Antoniades. Traversal to the rejections is collectively discussed below with respect to independent claim 35, which was rejected over Athale.

Claim 35 recites an optical switch for providing a concurrent unique switch path from any of a plurality of input links to any of a plurality of output links comprising:

an array of N to 1 switching elements,

where N is equal to the number of the plurality of input links, each switching element further comprising a plurality of path switches connecting each of the N input links to one output link; and

wherein the plurality of switching elements are configurable to create a plurality of unique paths through the optical cross-bar switch in a given switching time interval.

Applicant respectfully submits that Athale fails to establish a *prima facie* case of obviousness against claim 35 for similar reasons as submitted above with respect to claims 1 and 11. In particular, Applicant respectfully submits that Athale fails to teach each and every element as recited in claim 35, including "wherein the plurality of switching elements are configurable to create a plurality of unique paths through the optical cross-bar switch in a given switching time interval." The Examiner simply alleged, on page 9 of the Office Action, without providing technical reasons as to how controlling the switching elements as disclosed by Athale could create a plurality of unique paths through an optical cross-bar switch. Since Athale does not appear to teach or suggest controlling the switching elements to create a plurality of unique paths through an optical cross-bar switch, it would seem that this rejection is based on facts within the personal knowledge of the examiner. Per MPEP 2144.03, Applicant respectfully requests an affidavit from the examiner stating such facts. In the alternative, Applicant respectfully requests the rejection be withdrawn.

In view of the foregoing, claim 35 is submitted to recite subject matter not reached by Athale under 35 U.S.C. § 103(a) and therefore should be allowed. Reliance is placed on *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) for the allowance of dependent claims 36 and 39-42, since they differ in scope from their independent claim 35.

Claims 1-5, 8-10, 19-28, 31-33, 45-48, 50-54, 57-62 and 68 were again rejected under 35 U.S.C. §103(a) as being unpatentable over Xiong in view of a different secondary reference, U.S. Patent No. 6,763,192 ("Jagannathan"). Applicant notes that dependent claims 19-21 were improperly rejected over Xiong and Jagannathan as their independent claim 11 was not rejected over Xiong and Jagannathan. Traversal to the rejections is collectively discussed below with respect to independent claim 1, which was rejected over Xiong and Jagannathan.

The combination of Xiong and Jagannathan fails to establish a *prima facie* case of obviousness against claim 1 for similar reasons as submitted above with respect to the combination of Xiong and Athale. In particular, Applicant respectfully submits that the combination of Xiong and Jagannathan fails to teach each and every element as recited in claim

1. The Examiner did not articulate how the combination of Xiong and Jagannathan applies to claim 1. If this rejection is to be maintained in the next Office Action, Applicant respectfully requests the Examiner to provide technical reasons as to why the combination of Xiong and Jagannathan applies to claim 1 and cite specific columns and line numbers of Xiong and Jagannathan in support of his technical reasons. In the alternative, Applicant respectfully requests the rejection be withdrawn.

The Examiner appeared to rely on Jagannathan's teaching of using a switching matrix which is made up of an array of fast SOAs. As submitted above, there was no apparent reason that would have prompted one of ordinary skill in the art at the time the invention was made to use a switching matrix which is made up of an array of fast SOAs in Xiong, especially if Xiong is concerned with avoiding packet collisions and/or dropping burst payloads. Contrary to the Examiner's allegation on page 3 of the Office Action, it would not have been obvious to one of ordinary skill in the art at the time of the invention to simply use Jagannathan's switching matrix which is made up of an array of fast SOAs as the matrix switch of Xiong. Without the specifics which enable the creation of a plurality of unique paths in a given switching time interval, the combination of Xiong and Jagannathan would not have been able to transport optical data through an optical switching matrix without contention or congestion.

In view of the foregoing, claim 1 is submitted to recite subject matter not reached by Xiong and Jagannathan under 35 U.S.C. § 103(a) and therefore should be allowed. For similar reasons as submitted above, independent claims 22, 45, and 57 are submitted to be allowable over Xiong and Jagannathan. Reliance is placed on *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) for the allowance of dependent claims 2-5, 8-10, 23-28, 31-33, 46-48, 50-54, 58-62, and 68, since they differ in scope from their independent claims 1, 22, 45, and 57.

Non-rejected/Possible Allowable Claims

Applicant notes that claims 37-38, 43-44, 49, and 55-56 were not rejected over any of the applied art. An indication of allowability on claims 37-38, 43-44, 49, and 55-56 is therefore earnestly requested.

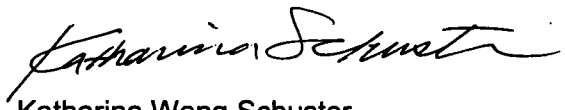
Conclusion

Applicant has now made an earnest attempt to place this case in condition for allowance. Other than as explicitly set forth above, this reply does not include any acquiescence to statements, assertions, assumptions, conclusions, or any combination thereof in the Office Action. For the foregoing reasons and for other reasons clearly apparent, Applicant respectfully requests full allowance of Claims 1-62 and 68. The Examiner is invited to telephone the undersigned at the number listed below for prompt action in the event any issues remain.

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group



Katharina Wang Schuster
Reg. No. 50,000

Dated: June 8, 2007
1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 371-9088